PATENT SPECIFICATION

DRAWINGS ATTACHED

Inventors: ARTHUR NIEL SMITH and LESLIE VICTOR CHAPMAN

966,156

966,156

Date of filing Complete Specification July 2, 1963.

Application Date July 3, 1962. *No. 25514/62.*

Complete Specification Published Aug. 6, 1964.

Index at acceptance:—**H2** A(2C1, 2C2, 2C3, 2E4, 2F, 2K8, 5E, 5L, 13D, 14)

International Classification:—**H 02 k**

COMPLETE SPECIFICATION

Dynamo-electric Machines

We, THE ENGLISH ELECTRIC COMPANY LIMITED, of English Electric House, Strand, London, W.C.2, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to dynamo-electric machines.

According to the present invention a dynamo-electric machine includes a wound stator member of which the core member and electrical winding are enveloped in an electrically-insulating resin mass, an unwound rotor member arranged for operation submerged in near-boiling water, and a tubular shielding member for protecting the resin mass against exposure to near-boiling water, the shielding member being disposed in the "air gap" between rotor and stator members and being formed of a plastics material which is resistant to degradation caused by prolonged exposure to near-boiling water.

By "near-boiling" water is meant water at a temperature which is greater than about 70°C, and not more than the boiling temperature at atmospheric pressure.

The shielding member may be formed, for example, of a suitable grade of any of the following thermo-plastics materials; polypropylene, high density polyethylene and polytetrafluorethylene.

The resin mass may comprise for example a mass of an epoxy resin, or of a polyester resin.

The resin mass may extend across one end of the stator member, and support at that end a bearing for the rotor member, the shielding member also extending across that end of the stator member whereby to shield the resin mass at that end from exposure to near-boiling water.

Where such a dynamo-electric machine is to be used as a motor in combination with a hot-water pump and a compartment of the motor in which is disposed the rotor member communicates with an impeller compartment of the pump, the shielding member also extends continuously between opposing surfaces of the motor and pump so as to prevent near-boiling water present in the two compartments contacting the cast resin mass.

One electric motor-pump unit for circulating near-boiling water in a domestic heating system, and embodying the present invention, will now be described with reference to the accompanying drawing. The drawing shows a cross-section of the unit taken on a vertical plane which passes through the axis of rotation of the pump impeller and rotor member of the motor.

Referring now to the drawing, the pump has an impeller 10 mounted for rotation in an impeller chamber 11 which is secured in a pipe line 12, 13. The chamber 11 comprises a cylindrical peripheral wall 14 into which the pipes 12 and 13 enter, an outer end wall 15 carrying centrally a bearing 16 for one end of a shaft 17 which is common to both the pump and the motor, and an inner annular end wall 18 against which abuts a stator member 19 of a squirrel cage induction motor.

The stator member 19 comprises a laminated stator core 20, an electrical winding 21 carried in slots formed in the stator core and having supply leads 22, a body of cast resin 23 in which the stator core and winding are enveloped (or encapsulated), and a shield or barrier 24 of polypropylene which lines the encapsulated stator core and winding.

The stator member 19 is recessed at one

end to carry a bearing 25 in which the other end of the said common shaft 17 of the motor and pump is mounted for rotation. The rotor core 26 of the motor carries a squirrel cage type winding, (not shown) and is mounted on the shaft 17 for co-operation with the stator core 20.

The stator member is secured to the pump casing by means (not shown) and sealing means 27 is provided for preventing leakage of water between the pump chamber and the polypropylene shield of the stator member when the hot water system is filled with water.

When in operation hot water at a temperature of about 85°C fills the pipe lines 12, 13, the impeller chamber, and the rotor chamber within the stator member, so that the motor rotor operates in a fully submerged condition.

The encapsulating cast resin may be an epoxy resin, though alternatively a polyester resin may be used if desired. The polypropylene shield is intended to protect such encapsulating resins from the effects of thermal degradation which are otherwise encountered if these resins are exposed to near-boiling water for prolonged periods.

The polypropylene shield is formed by an injection moulding process. Satisfactory shields have been made using a grade of polypropylene commercially available as "Carlona P" KM81. (Carlona is a registered Trade Mark.)

By using such a shield as 24 normal encapsulating resins may be used to protect and support the stator core and winding, thus avoiding the necessity for developing and using a special encapsulating resin which not only has a low gellation shrinkage and is able to withstand thermal changes in the dimensions of the stator core and windings, but which also has a high resistance to thermal degradation when exposed to near-boiling water for prolonged periods of time.

Although the above shield is formed of polypropylene, any other plastics material which is stable in the presence of near-boiling water may be used in place of polypropylene, as for example, suitable grades of high density polythene or polytetrafluorethylene.

WHAT WE CLAIM IS:—

1. A dynamo-electric machine including a wound stator member of which the core member and electrical winding are enveloped in an electrically-insulating resin mass, an unwound rotor member arranged for operation submerged in near-boiling water, and a tubular shielding member for protecting the resin mass against exposure to near-boiling water, the shielding member being disposed in the "air gap" between rotor and stator members and being formed of a plastics material which is resistant to degradation caused by prolonged exposure to near-boiling water.

2. A dynamo-electric machine according to Claim 1, wherein the shielding member is formed of polypropylene.

3. A dynamo-electric machine according to Claim 1, wherein the shielding member is formed of high density polyethylene.

4. A dynamo-electric machine according to Claim 1, wherein the shielding member is formed of polytetrafluorethylene.

5. A dynamo-electric machine according to any preceding claim, wherein the resin mass comprises a mass of an epoxy resin.

6. A dynamo-electric machine according to any of Claims 1 to 4, wherein the resin mass comprises a mass of a polyester resin.

7. A dynamo-electric machine according to any preceding claim, wherein the resin mass extends across one end of the stator member and supports at that end a bearing member for the rotor member, the shielding member also extending across that end of the stator member so as to shield the resin mass at that end from exposure to near-boiling water.

8. An electric motor according to Claim 7 in combination with a hot-water pump, wherein a compartment of the motor in which is disposed the rotor member communicates with an impeller compartment of the pump, and wherein the shielding member also extends continuously between opposing surfaces of the motor and pump so as to prevent near-boiling water present in the two compartments contacting the resin mass.

9. An electric motor-pump unit substantially as herein described with reference to the accompanying drawing.

D. A. SENHENN,
Chartered Patent Agent.

Leamington Spa: Printed for Her Majesty's Stationery Office by the Courier Press.—1964.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

966156 COMPLETE SPECIFICATION

1 SHEET *This drawing is a reproduction of the Original on a reduced scale*